

## Patent Abstracts of Japan

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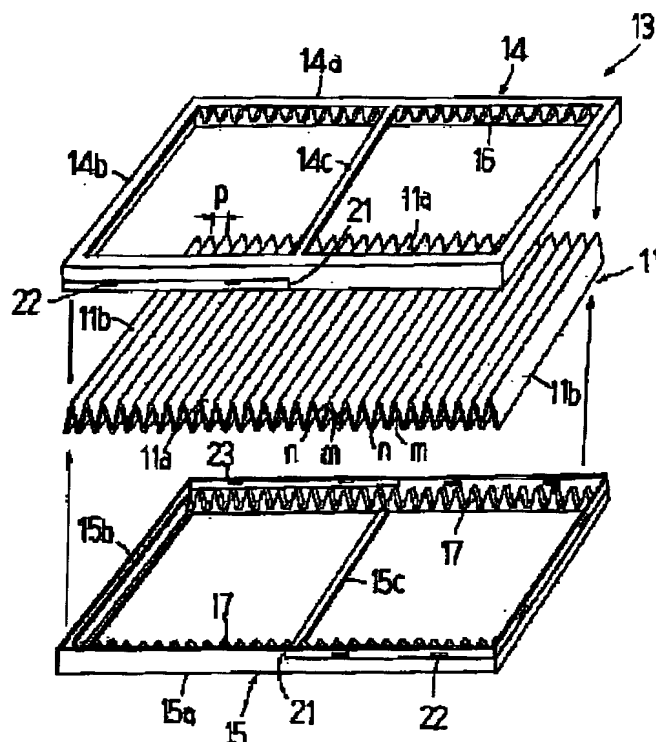
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TITLE : FILTER DEVICE FOR CLEANING AIR



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# PATENT ABSTRACTS OF JAPAN

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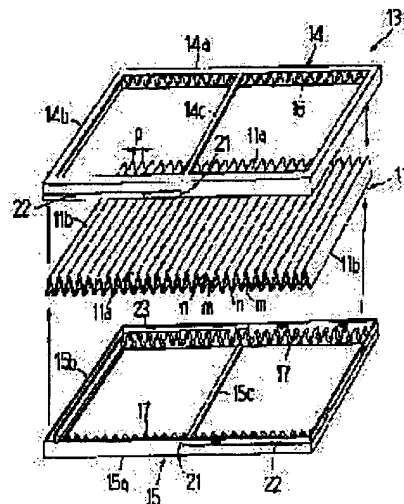
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## (54) FILTER DEVICE FOR CLEANING AIR

### (57)Abstract:

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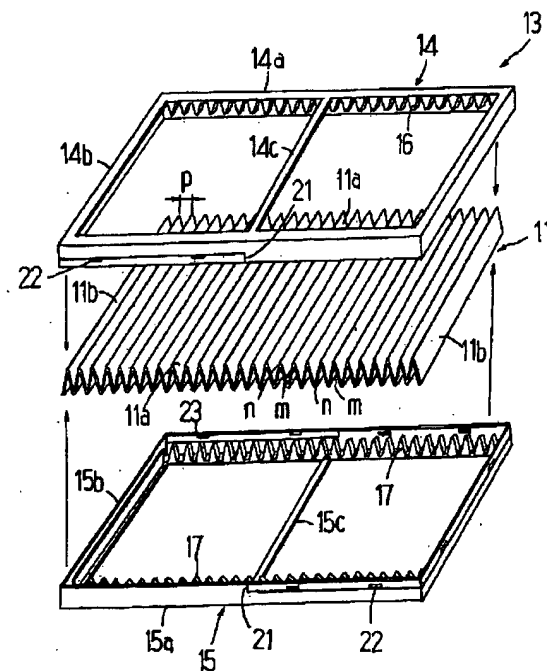
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(54) 【発明の名称】 空気清浄用フィルター装置

(57) 【要約】

【課題】 波板状フィルター材の周縁部に枠体を嵌着した空気清浄用フィルター装置の製造組立コストの低減化。

【解決手段】 三角波板状に折り込んだフィルター材11の波板状周縁部11aに嵌着される枠体14、15の内面にフィルター材周縁部11aの凹波部mに嵌合される突起16、17を配設し、周縁部11aの表裏両面の凹波部mの各々に突起16、17を嵌合することで、フィルター材11の波ピッチpを所定ピッチに揃え、フィルター材11の形状寸法を規制する。このようにすることでフィルター材11が伸縮可能な波板状の単品が使用できて、フィルター装置の製造組立コストの低減化が容易となる。



## 【特許請求の範囲】

【請求項1】 波板状の濾過式フィルター材の周縁部に枠体を嵌着した空気清浄用フィルター装置において、フィルター材の波板状周縁部の凹波部と凸波部が交互に連続する波面の凸波部が当接される枠体の内面に、フィルター材の波板状周縁部の凹波部に嵌合して波板状フィルター材の形状寸法を規制する突起を配設したことを特徴とする空気清浄用フィルター装置。

【請求項2】 波板状フィルター材の周縁部に、この周縁部の表裏両面側から嵌着されて互いに離脱可能に結合される一対の枠体の少なくとも一方の内面に突起を配設したことを特徴とする請求項1記載の空気清浄用フィルター装置。

【請求項3】 フィルター材の波板状周縁部の連続する複数の凹波部の各々に突起を嵌合させたことを特徴とする請求項1又は2記載の空気清浄用フィルター装置。

【請求項4】 樹脂成形品の枠体に突起を一体成形したことを特徴とする請求項1乃至3いずれか1記載の空気清浄用フィルター装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、冷暖房機、換気扇、空調設備等に使用される空気清浄用フィルター装置で、詳しくは波板状の濾過式フィルター材の周縁部に枠体を嵌着した空気清浄用フィルター装置の組立構造に関する。

## 【0002】

【従来の技術】不織布や濾紙等の濾過式フィルター材で空気を浄化する空気清浄用フィルター装置は、フィルター材を波板状（蛇腹状）に成形して空気が通過する表面積を大きくすることで、フィルター材の空気浄化機能を高めたものが一般的である。この空気清浄用フィルター装置は、波板状フィルター材の周縁部に硬質の枠体を嵌着して波板状フィルター材の形状を安定化させている。

【0003】図10に示すように、従来のフィルター材1は、不織布や濾紙の矩形材料を定ピッチで交互に逆方向に折り曲げて三角波板状に成形したもので、これの波板状周縁部1aの開口端面に周縁部1aの波ピッチpを描える補強材2が接着される。すなわち、波板状フィルター材1の波方向を横方向とすると、フィルター材1は横方向で伸縮して形状が安定せず、このままのフィルター材1の波板状の対向二辺の周縁部1aと残りの対向二辺の周縁部1bに枠体を嵌着して補強しても、枠体に対して波板状フィルター材1が伸縮して枠体から外れたり、フィルター材1の横方向での波ピッチpが大小揃いとなる等の不具合が生じることから、フィルター材1の波板状周縁部1aの開口端面に波ピッチpを固定化する補強材2を接着している。補強材2は、伸縮しないテープや線条体である。

## 【0004】

【発明が解決しようとする課題】波板状フィルター材1の対向二辺の周縁部1aにこの周縁部1aの波ピッチpを描える補強材2を接着する作業工程の作業性が悪く、空気清浄用フィルター装置の製造組立コストの低減化が難しい。また、補強材2のために空気清浄用フィルター装置の部品点数が多くなり、その分、材料コストが高くなる。

【0005】また、汚れた波板状フィルター材と交換されるフィルター材の新品は、フィルター製造工場等に保管され、工場出荷されて店頭販売等される。このような交換用フィルター材は、波板状フィルター材の波ピッチを補強材で固定化して全体のサイズを再使用される定形の枠体サイズに合わせたものである。つまり、交換用フィルター材を定形の枠体サイズより小形に縮小化して保管したり、店頭販売等することが難しく、交換用フィルター材の保管スペース、店頭販売スペースの縮小化が難しい。

【0006】本発明の目的は、製造組立コストの低減化が容易な空気清浄用フィルター装置を提供することにある。

## 【0007】

【課題を解決するための手段】上記目的を達成する本発明の請求項1の発明は、波板状の濾過式フィルター材の周縁部に枠体を嵌着した空気清浄用フィルター装置において、フィルター材の波板状周縁部の凹波部と凸波部が交互に連続する波面の凸波部が当接される枠体の内面に、フィルター材の波板状周縁部の凹波部に嵌合して波板状フィルター材の形状寸法を規制する突起を配設したことを特徴とする。

【0008】ここで、枠体内面の突起は枠体と一体物、別体物のいずれかであり、波板状フィルター材の周縁部に枠体を嵌着するときに突起がフィルター材周縁部の凹波部に嵌合してフィルター材を所定の波ピッチの波板形状に規制する。この形状規制で枠体に取り付けられる前の波板状フィルター材の波ピッチは任意でよく、したがって、交換用フィルター材を定形の枠体サイズより小形に縮小しておくことが可能となる。

【0009】また、本発明の請求項2の発明は、上記波板状フィルター材の周縁部に、この周縁部の表裏両面側から嵌着されて互いに離脱可能に結合される一対の枠体の少なくとも一方の内面に突起を配設したことを特徴とする。ここで、一対の枠体の一方だけに突起を設けると、波板状フィルター材の表裏面の片面に突起が嵌合されて波板状の形状と寸法が規制され、一対の枠体の両方に突起を設けると、波板状フィルター材の表裏両面に突起が嵌合されて波板状の形状と寸法がより安定したものとなる。

【0010】本発明の請求項3の発明は、上記フィルター材の波板状周縁部の連続する複数の凹波部の各々に突起を嵌合させたことを特徴とする。つまり、フィルター

材の波板状周縁部の連続する複数の凹波部の適所だけに選択的に枠体の突起を嵌合することも可能であるが、複数の凹波部の全てに突起を嵌合させることが、フィルター材の波板状周縁部と枠体の間をより機密にしてフィルター材の空気清浄機能を高める上で望ましい。

【0011】本発明の請求項4の発明は、樹脂成形品の枠体に突起を一体成形したことを特徴とする。つまり、枠体は樹脂製品や板金製品、紙製品の適用が可能であり、樹脂製品の場合は枠体を樹脂成形するときに突起も一体成形するようにすれば、枠体が突起の有無に関係なく安価に量産される。

#### 【0012】

【発明の実施の形態】以下、本発明の実施形態例を図1乃至図9を参照して説明する。

【0013】図1の分解図に示される空気清浄用フィルター装置は、全体が矩形で断面形状が三角波板状の透過式フィルター材11と、フィルター材11の矩形の周縁部11a、11bに脱着可能に嵌着される矩形の枠体13で構成される。フィルター材11は、大面積の不織布や濾紙の矩形材料を定ピッチで交互に逆方向に折り曲げて三角波板状に成形したもので、これの対向二辺の波板状周縁部11aは凹波部mと凸波部nが交互に連続する波面で形成される。枠体13が嵌着される前の図1のフィルター材11の波ピッチp（隣接凸波部間隔、又は、隣接凹波部間隔）は任意である。

【0014】枠体13は、例えば同一寸法形状の樹脂成形品である第1枠体14と第2枠体15の一对で構成される。第1枠体14は矩形枠で、フィルター材11の対向二辺の波板状周縁部11aにフィルター材11の表面側から嵌着される一对の横枠部14aと、一对の横枠部14aの両端を連結する縦枠部14bと、一对の横枠部14aの中央を連結するフィルター材脱落防止枠部14cを有する。一对の横枠部14aは図5に示すような断面L形で、フィルター材11の波板状周縁部11aの表面側の凸波部nが当接する内面14dに突起16が配設される。横枠部14aにフィルター材11の波板状周縁部11aが嵌着されたとき、周縁部11aの連続する複数の三角断面の凹波部mの各々に三角断面の突起16が嵌合して、周縁部11aの表面側の波ピッチpが一定に揃えられ、周縁部11aの寸法形状が一定に規制される。突起16は、樹脂製枠体14の樹脂成形時に一体成形される。

【0015】第1枠体14と同一寸法形状の第2枠体15も矩形枠で、フィルター材11の対向二辺の波板状周縁部11aにフィルター材11の裏面側から嵌着される一对の横枠部15aと、一对の横枠部15aの両端を連結する縦枠部15bと、一对の横枠部15aの中央を連結するフィルター材脱落防止枠部15cを有する。一对の横枠部15aは断面L形で、フィルター材11の波板状周縁部11aの裏面側の凸波部nが当接する内面15

dに突起17が配設される。横枠部15aにフィルター材11の波板状周縁部11aが嵌着されたとき、周縁部11aの連続する複数の凹波部mの各々に三角断面の突起17が嵌合して、周縁部11aの裏面側の波ピッチpが揃えられ、周縁部11aの寸法形状が一定に規制される。突起17は、樹脂製枠体15の樹脂成形時に一体成形される。

【0016】矩形の波板状フィルター材11の周縁部に第1枠体14と第2枠体15を嵌着したフィルター装置が図2に示され、部分拡大断面図が図3、図4に示され、組立前の部分拡大断面図が図5、図6に示される。このフィルター装置において、両枠体14、15は相互にワンタッチ式に嵌合する構造である。例えば、第1枠体14の横枠部14aが、突起16の在る内面14dを有する外枠板14eとこの外枠板14eの外側端と直交する端枠板14fで構成されたとすると、端枠板14fの中央にスリット21を形成し、スリット21で二分された端枠板14fの片半分に係止穴22を形成し、他の片半分に係止爪23を形成する。同様に第2枠体15の横枠部15aも突起17の在る内面15dを有する外枠板15eとこの外枠板15eの外側端と直交する端枠板15fを有し、端枠板15fの中央にスリット21が形成され、スリット21の両側に係止穴22と係止爪23が形成される。両枠体14、15の横枠部14a、15aを波板状フィルター材11の周縁部11aに嵌着させるとき、両方の横枠部14a、15aの端枠板14e、15e同士を各々のスリット21、21を交差させて重畳させ、一方の係止爪23を他方の係止穴22に係止させることで、両横枠部14a、15aがワンタッチで嵌合される。

【0017】図2のフィルター装置において、フィルター材11の波板状周縁部11aの表面側と裏面側の凹波部mの各々に両枠体14、15の突起16、17が嵌合されて、波板状周縁部11aが突起16、17で挟持された状態で波ピッチpが一定に規制され、この規制でフィルター材11の全体の波板形状、全体のサイズが規制されて、両枠体14、15内にフィルター材11が安定した姿勢、取付強度で装着される。また、フィルター材11の波板状周縁部11aの各凹波部mに突起16、17が嵌合することで、波板状周縁部11aが突起16、17でシールされた形となって、フィルター装置に送られる空気がフィルター材11を通過する際に、フィルター材11を通過せずに周縁部11aと枠体14、15の間から漏れる空気量が減少して、結果的にフィルター材11の空気清浄機能が增大する。このような機能増大化は、突起16、17を肉厚にしてフィルター材周縁部11aとの接触面積を増大させるほど効果的である。

【0018】図2の空気清浄用フィルター装置は、フィルター材11がゴミ等の付着で汚れて空気清浄機能が低下すると、フィルター材11から枠体13が取り外され

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て汚れたフィルター材11だけが廃棄処分され、枠体13は新しいフィルター材に嵌着されて再使用される。新品の交換用フィルター材は、例えば図7に示す波板状フィルター材11'である。この交換用フィルター材11'は凹凸方向の幅方向に伸縮自在であることから、幅方向に縮小させて最小サイズかつ最小体積の状態を保管し、包装して店頭販売等されるものの適用が、交換品の保管スペースや店頭販売スペースの縮小化と包装材料費の低減化の上で望ましい。

【0019】本発明のフィルター装置で使用される枠体10は、同一寸法形状の一对の樹脂製枠体に限らず、形状の異なる一对の樹脂製枠体や板金製枠体、或いは、材質の異なる一对の枠体で構成してもよい。また、枠体に形成される突起は、枠体が樹脂の場合は一体成形することが製作上に有利であるが、枠体と別体の突起を枠体に取り付けるようにしてもよく、その具体例を図8に示す。図8に示される枠体13に対して樹脂成形品の突起18を別体に製造する。突起18は複数を一体成形した樹脂成形品で、この突起18を枠体13の所定位置に接着剤等で固定する。このように枠体13と突起18を別体にする

と、枠体13に従来の既存品が適用できる。

【0020】また、本発明のフィルター装置で使用される枠体を一对で構成して、この一对の枠体の双方に突起を設けるようにしたが、フィルター材のサイズ、種類によっては一对の枠体の一方にだけ突起を設けるようにしてもよい。また、枠体の突起を波板状フィルター材の凹波部の全てに嵌合させるようにしたが、複数の凹波部の選択された部分だけに嵌合させるように突起を枠体に配設するようにしてもよい。その具体例を図9に示す。図9は、図2のフィルター装置における第1枠体14の突起16と第2枠体15の突起17を1つ置きに省略した突起配列状態が示される。

【0021】さらに、本発明のフィルター装置で使用される枠体は、以上に例示したものに限定されず、本発明の目的効果を達成し得る範囲で適宜改変することができる。例えば、図1において、スリット21、係止穴22、係止爪23を省略して、容易に着脱できる構造としても良い。

【0022】

【発明の効果】本発明によれば、波板状フィルター材の周縁部に枠体を嵌着したときに枠体の突起がフィルター材の波板状周縁部の凹波部に嵌合して、フィルター材を

所定の波板形状に保持するので、フィルター材に不織布や汙紙等を単に波板状に折り込んだ量産が容易で製作費の安い単品が使用できて、フィルター装置の製造組立コストの低減化が図れる。

【0023】また、波板状フィルター材の周縁部の凹波部を枠体の突起が埋めることで、枠体とフィルター材周縁部との隙間が低減されて、フィルター材の空気清浄機能の強化が図れる。

【0024】また、汚れたフィルター材の交換品が伸縮可能な波板状フィルター材であるため、この交換品を枠体サイズより小形に縮小して包装、保管、店頭販売等することができ、このようにすることで交換用フィルター材の包装費の低減化、保管スペース、店頭販売スペースの縮小化が可能となる。

【図面の簡単な説明】

【図1】本発明の第1の実施形態を示す空気清浄用フィルター装置の分解斜視図。

【図2】図1フィルター装置の組立後の斜視図。

【図3】図2フィルター装置の部分拡大断面図。

【図4】図3T1-T1線に沿う断面図。

【図5】図2フィルター装置の組立時の部分断面図。

【図6】図5T2-T2線に沿う断面図。

【図7】図1フィルター装置におけるフィルター材の保管時等の斜視図。

【図8】本発明の第2の実施形態例を説明するための枠体の部分斜視図。

【図9】本発明の第3の実施形態例を説明するためのフィルター装置の部分断面図。

【図10】従来のフィルター装置の波板状フィルター材の製作時の斜視図。

【符号の説明】

11 フィルター材

11' フィルター材

11a 波板状周縁部

m 凹波部

n 凸波部

13 枠体

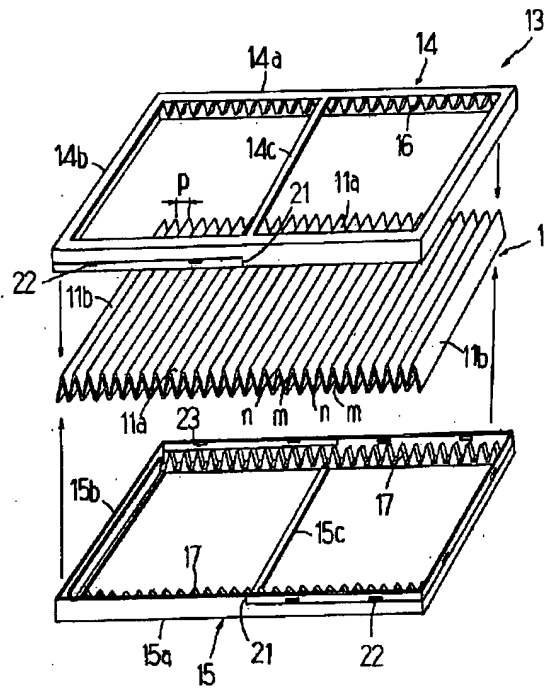
14 (第1)枠体

15 (第2)枠体

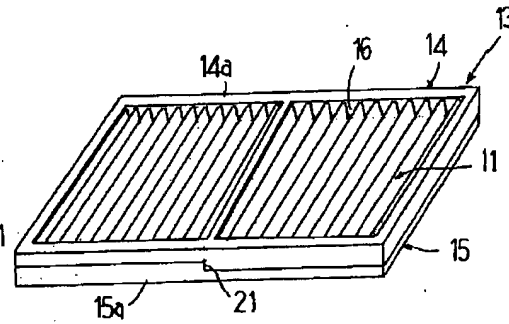
16, 17 突起

18 突起

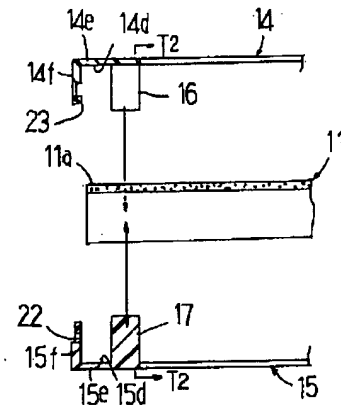
【図1】



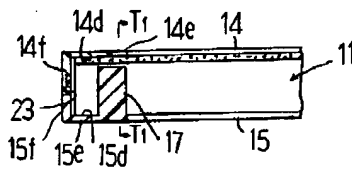
【図2】



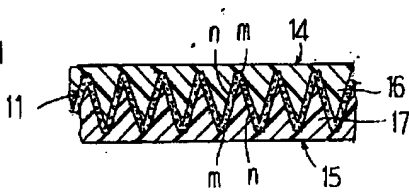
【図5】



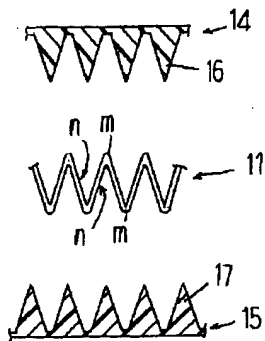
【図3】



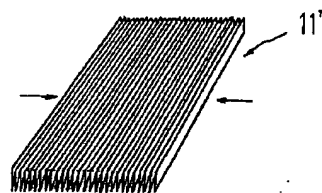
【図4】



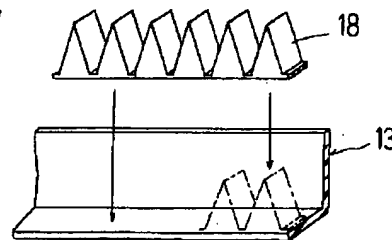
【図6】



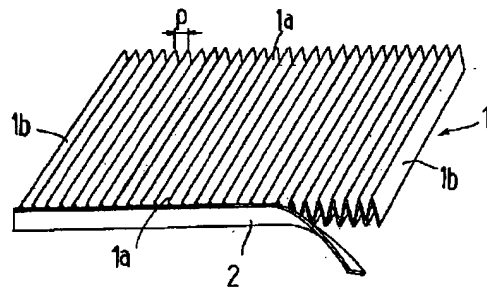
【図7】



【図8】



【図10】





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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention is filter equipment for air pure used for an air conditioning machine, a ventilating fan, an air conditioner, etc., and relates to the prefabricated frame structure of the filter equipment for air pure which attached the frame in the periphery section of corrugated plate-like filtration formula filter material in detail.

[0002]

[Description of the Prior Art] The filter equipment for air pure which purifies air by filtration formula filter material, such as a nonwoven fabric and a filter paper, is enlarging the surface area which fabricates filter material in the shape of a corrugated plate (the shape of bellows), and air's passes, and what raised the air cleaning function of filter material is common. This filter equipment for air pure attaches a hard frame in the periphery section of corrugated plate-like filter material, and is stabilizing the configuration of corrugated plate-like filter material.

[0003] As shown in drawing 10, the conventional filter material 1 is what bent a nonwoven fabric and the rectangle material of a filter paper to the opposite direction by turns in the constant pitch, and was fabricated to the triangular-wave tabular, and the reinforcing materials 2 which arrange the wave pitch p of periphery section 1a with the opening end face of corrugated plate-like periphery section 1a of this paste it up. Namely, will expand and contract in a longitudinal direction, and a configuration will not be stabilized by the filter material 1 if the direction of a wave of the corrugated plate-like filter material 1 is made into a longitudinal direction. Even if it attaches and reinforces a frame at periphery section of periphery section of two sides of opposite of shape of corrugated plate of filter material 1 with this 1a, and two sides of the remaining opposite 1b a frame -- receiving -- the corrugated plate-like filter material 1 -- expanding and contracting -- separating from a frame \*\*\*\* -- the wave pitch p in the longitudinal direction of the filter material 1 -- size -- since fault, such as becoming irregular, arises, the reinforcing materials 2 which fix the wave pitch p have been pasted up on the opening end face of corrugated plate-like periphery section 1a of the filter material 1 Reinforcing materials 2 are the tape and corpus striatum which are not expanded and contracted.

[0004]

[Problem(s) to be Solved by the Invention] The workability of the routing which pastes up the reinforcing materials 2 which arrange the wave pitch p of this periphery section 1a with periphery section of two sides of opposite of corrugated plate-like filter material 1 1a is bad, and reduction-izing of the manufacture assembly cost of the filter equipment for air pure is difficult. Moreover, the part mark of the filter equipment for air pure increase for reinforcing materials 2, and the part and material cost become high.

[0005] Moreover, the new article of filter material exchanged for the unclean corrugated plate-like filter material is kept by the filter plant etc., factory shipments are carried out, and over-the-counter sales etc. are carried out. Such filter material for exchange fixes the wave pitch of corrugated plate-like filter material by reinforcing materials, and doubles the whole size with the frame size of the fixed form by which a reuse is carried out. That is, it is difficult to reduction-ize the filter material for exchange from the frame size of a fixed form to small, and to keep it, or to carry out over-the-counter sales etc., and reduction-izing of the storage space of the filter material for exchange and an over-the-counter-sales space is difficult.

[0006] The purpose of this invention has reduction-ization of manufacture assembly cost in offering the easy filter equipment for air pure.

[0007]

[Means for Solving the Problem] Invention of the claim 1 of this invention which attains the above-mentioned purpose In the filter equipment for air pure which attached the frame in the periphery section of corrugated plate-like filtration formula filter material It is characterized by arranging the salient which fits into \*\*\*\*\* of the corrugated plate-like periphery section of filter material, and regulates the geometry of corrugated plate-like filter material to the inside of the frame with which \*\*\*\*\* of the wave front which \*\*\*\*\* and \*\*\*\*\* of the corrugated plate-like periphery section of filter material follow by turns is contacted.

[0008] Here, the salient of a frame inside is a frame and really an object or another \*\*\*\*, and when attaching a frame in the periphery section of corrugated plate-like filter material, a salient fits into \*\*\*\*\* of the filter material periphery section, and it regulates filter material in the corrugated plate configuration of a predetermined wave pitch. The wave pitch of the corrugated plate-like filter material before a frame is attached by this configuration regulation becomes possible [ reducing the filter material for exchange to small from the frame size of a fixed form ] arbitrarily therefore.

[0009] Moreover, invention of the claim 2 of this invention is characterized by arranging a salient in one [ at least ] inside of the frame of the couple which is attached in the periphery section of the above-mentioned corrugated plate-like filter material from front reverse side both-sides side of this periphery section, and is mutually combined with it possible [ secession ]. Here, if a salient will fit into one side on the rear face of front of corrugated plate-like filter material, corrugated plate-like a configuration and a size will be regulated, if a salient is prepared only in one side of the frame of a couple, and a salient is prepared in both frames of a couple, it will become that by which the salient fitted into front reverse side both sides of corrugated plate-like filter material, and corrugated plate-like a configuration and a size were stabilized more.

[0010] Invention of the claim 3 of this invention is characterized by making a salient fit into each of two or more \*\*\*\*\* which the corrugated plate-like periphery section of the above-mentioned filter material follows. That is, although it is also possible to fit the salient of a frame only into the proper place of two or more \*\*\*\*\* where the corrugated plate-like periphery section of filter material continues alternatively, it is desirable, when making a salient fit into two or more \*\*\*\*\* of all makes secrecy more between the corrugated plate-like periphery section of filter material, and frames and it raises the air pure function of filter material.

[0011] Invention of the claim 4 of this invention is characterized by really fabricating a salient to the frame of resin mold goods. That is, application of a resin product, a sheet metal product, and a paper product is possible for a frame, and if a salient is also really fabricated when it is a resin product and resin fabrication of the frame is carried out, a frame will be cheaply mass-produced by the existence of a salient not related.

[0012]

[Embodiments of the Invention] Hereafter, the example of an operation gestalt of this invention is explained with reference to drawing 1 or drawing 9.

[0013] The filter equipment for air pure shown in the exploded view of drawing 1 consists of rectangular frames 13 with which the whole is attached with a rectangle possible [ desorption ] for a cross-section configuration in the periphery sections 11a and 11b of the rectangle of the filtration formula filter material 11 of a triangular-wave tabular, and the filter material 11. The filter material 11 is what bent the nonwoven fabric of a large area, and the rectangle material of a filter paper to the opposite direction by turns in the constant pitch, and was fabricated to the triangular-wave tabular, and corrugated plate [ of two sides of opposite of this ]-like periphery section 11a is formed on the wave front which \*\*\*\*\* m and \*\*\*\*\* n follow by turns. The wave pitch p of the filter material 11 of drawing 1 before a frame 13 is attached (a contiguity \*\*\*\*\* interval or contiguity \*\*\*\*\* interval) is arbitrary.

[0014] A frame 13 consists of couples of the 1st frame 14 which is the resin mold goods of the same size configuration, and the 2nd frame 15. The 1st frame 14 is a rectangle frame and has filter material omission prevention frame part 14c which connects the center of door-post section 14b which connects the ends of transversal frame section 14a of the couple attached in corrugated plate [ of two sides of opposite of the filter material 11 ]-like periphery section 11a from the front-face side of the filter material 11, and transversal frame section 14a of a couple, and transversal frame section 14a of a couple. Transversal frame section 14a of a couple is cross-section L form as shown in drawing 5, and salient 16 is arranged by 14d of insides which \*\*\*\*\* n by the side of the front face of corrugated plate-like periphery section 11a of the filter material 11 contacts. When corrugated plate-like periphery section 11a of the filter material 11 is attached in transversal frame section 14a, the salient 16 of a triangular cross section fits into each of \*\*\*\*\* m of two or more triangular cross sections which periphery section 11a follows, the wave pitch p by the side of the front face of periphery section 11a is arranged uniformly, and the size configuration of periphery section 11a is regulated uniformly. Salient 16 is really fabricated at the time of resin fabrication of the frame 14 made of a resin.

[0015] The 2nd frame 15 of the same size configuration as the 1st frame 14 also has filter material omission prevention frame part 15c which connects the center of door-post section 15b which connects the ends of transversal frame section 15a of the couple attached in corrugated plate [ of two sides of opposite of the filter material 11 ]-like periphery section 11a from the rear-face side of the filter material 11, and transversal frame section 15a of a couple, and transversal frame section 15a of a couple by the rectangle frame. Transversal frame section 15a of a couple is cross-section L form, and salient 17 is arranged by 15d of insides which \*\*\*\*\* n by the side of the rear face of corrugated plate-like periphery section 11a of the filter material 11 contacts. When corrugated plate-like periphery section 11a of the filter material 11 is attached in transversal frame section 15a, the salient 17 of a triangular cross section fits into each of two or more \*\*\*\*\* m which periphery section 11a follows, the wave pitch p by the side of the rear face of periphery section 11a is arranged, and the size configuration of periphery section 11a is regulated uniformly. Salient 17 is really fabricated at the time of resin fabrication of the frame 15 made of a resin.

[0016] The filter equipment which attached the 1st frame 14 and the 2nd frame 15 in the periphery section of the rectangular corrugated plate-like filter material 11 is shown in drawing 2, a partial expanded sectional view is shown in drawing 3 and drawing 4, and the partial expanded sectional view before assembly is shown in drawing 5 and drawing 6. In this filter equipment, both the frames 14 and 15 are structures which fit in mutually at an one-touch formula. For example, supposing transversal frame section 14a of the 1st frame 14 consists of 14f of edge frame boards which intersect perpendicularly with the outside edge of outer frame board 14e which has 14d of insides with salient 16, and this outer frame board 14e a slit 21 is formed in the center of 14f of edge frame boards, the stop hole 22 is formed in the piece half of 14f of edge frame boards bisected to the slit 21, and the stop presser foot stitch tongue 23 is formed in other piece halves. Similarly, it has 15f of edge frame boards which intersect perpendicularly with the outside edge of outer frame board 15e which has 15d of insides in which transversal frame section 15a of the 2nd frame 15 also has salient 17, and this outer frame board 15e, a slit 21 is formed

in the center of 15f of edge frame boards, and the stop hole 22 and the stop presser foot stitch tongue 23 are formed in the both sides of a slit 21. When making the transversal frame sections 14a and 15a of both the frames 14 and 15 attach in periphery section 11a of the corrugated plate-like filter material 11, Each slits 21 and 21 are made to cross, the polymerization of edge frame board 14e of both transversal frame sections 14a and 15a and the 15e is carried out, and both the transversal frame sections 14a and 15a fit in by one-touch by making the stop hole 22 of another side stop one stop presser foot stitch tongue 23.

[0017] In the filter equipment of drawing 2, the salients 16 and 17 of both the frames 14 and 15 fit into each of \*\*\*\*\* m by the side of the front face of corrugated plate-like periphery section 11a of the filter material 11, and a rear face. Where corrugated plate-like periphery section 11a is pinched by salients 16 and 17, the wave pitch p is regulated uniformly, the corrugated plate configuration of the whole filter material 11 and the whole size are regulated by this regulation, and it is equipped by both the frames 14, the posture by which the filter material 11 was stabilized in 15, and attachment intensity. By moreover, the thing which salients 16 and 17 fit into each \*\*\*\*\* m of corrugated plate-like periphery section 11a of the filter material 11 In case the air which serves as the form where the seal of the corrugated plate-like periphery section 11a was carried out by salients 16 and 17, and is sent to filter equipment passes the filter material 11 The air content which leaks from between periphery section 11a and frames 14 and 15, without passing the filter material 11 decreases, and the air pure function of the filter material 11 increases as a result. It is so effective that such functional increase-ization makes salients 16 and 17 thick and increases a touch area with filter material periphery section 11a.

[0018] The disposal only of the filter material 11 in which the frame 13 was removed from the filter material 11, and the filter equipment for air pure of drawing 2 became dirty when the filter material 11 became dirty from adhesion of dust etc. and the air pure function fell is carried out, and the reuse of the frame 13 is attached and carried out to new filter material. The new filter material for exchange is corrugated plate-like filter material 11' shown in drawing 7. This filter material 11' for exchange has desirable application on reduction-izing of the storage space of an exchange article, or an over-the-counter-sales space, and reduction-izing of wrapping expense, although it is made to reduce crosswise and is kept in the state of a minimum size and the minimum volume, and it packs and over-the-counter sales etc. are carried out, since it is elastic to the cross direction of the concavo-convex direction.

[0019] The frame used with the filter equipment of this invention may consist of a frame made of a resin of a couple with which not only the frame made of the couple of the same size configuration but configurations differ, a frame made from sheet metal, or a frame of a couple with which the quality of the materials differ. Moreover, although really fabricating is advantageous on manufacture as for the salient formed in a frame when a frame is a resin, you may make it attach the salient of a frame and another object in a frame, and it shows the example to drawing 8. The salient 18 of resin mold goods is manufactured on another object to the frame 13 shown in drawing 8. Salients 18 are the resin mold goods which really fabricated plurality, and fix this salient 18 to the predetermined position of a frame 13 with adhesives etc. Thus, if salient 18 is a frame 13 at another object, the conventional existing article is applicable to a frame 13.

[0020] Moreover, although the frame used with the filter equipment of this invention is constituted from a couple and the salient was prepared for the both sides of the frame of this couple, you may make it prepare a salient only in one side of the frame of a couple depending on the size of filter material, and a kind. Moreover, although it was made to make the salient of a frame fit into all the \*\*\*\*\* of corrugated plate-like filter material, you may make it arrange a salient in a frame so that only the portion as which two or more \*\*\*\*\* were chosen may be made to fit in. The example is shown in drawing 9. The salient array state where drawing 9 omitted the salient 16 of the 1st frame 14 and the salient 17 of the 2nd frame 15 in the filter equipment of drawing 2 alternately is shown.

[0021] Furthermore, the frame used with the filter equipment of this invention is not limited to what was illustrated above, but can be suitably changed in the range which can attain the purpose effect of this invention. For example, in drawing 1, it is good also as structure which omits a slit 21, the stop hole 22, and the stop presser foot stitch tongue 23, and can be detached and attached easily.

[0022]

[Effect of the Invention] Since according to this invention the salient of a frame fits into \*\*\*\*\* of the corrugated plate-like periphery section of filter material and holds filter material in a predetermined corrugated plate configuration when a frame is attached in the periphery section of corrugated plate-like filter material, the mass production which only inserted the nonwoven fabric, the filter paper, etc. into filter material in the shape of a corrugated plate is easy, the cheap item of a manufacturing cost can be used and reduction-ization of the manufacture assembly cost of filter equipment can be attained.

[0023] Moreover, the crevice between a frame and the filter material periphery section is reduced, and the air pure function of filter material can be strengthened because the salient of a frame buries \*\*\*\*\* of the periphery section of corrugated plate-like filter material.

[0024] Moreover, since it is the corrugated plate-like filter material which can expand and contract the exchange article of the unclean filter material, reduction-ization of reduction-izing of the packing charge of the filter material for exchange, a storage space, and an over-the-counter-sales space is attained by being able to reduce to small, being able to carry out packing, storage, over-the-counter sales, etc., and carrying out this exchange article in this way from frame size.

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CLAIMS

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[Claim(s)]

[Claim 1] Filter equipment for air pure characterized by to arrange the salient which fits into \*\*\*\*\* of the corrugated plate-like periphery section of filter material, and regulates the geometry of corrugated plate-like filter material to the inside of the frame with which \*\*\*\*\* of the wave front which \*\*\*\*\* and \*\*\*\*\* of the corrugated plate-like periphery section of filter material follow by turns is contacted in the filter equipment for air pure which attached the frame in the periphery section of corrugated plate-like filtration formula filter material.

[Claim 2] Filter equipment for air pure according to claim 1 characterized by arranging a salient in one [ at least ] inside of the frame of the couple which is attached in the periphery section of corrugated plate-like filter material from front reverse side both-sides side of this periphery section, and is mutually combined with it possible [ secession ].

[Claim 3] Filter equipment for air pure according to claim 1 or 2 characterized by making a salient fit into each of two or more \*\*\*\*\* which the corrugated plate-like periphery section of filter material follows.

[Claim 4] The claim 1 characterized by really fabricating a salient to the frame of resin mold goods, or filter equipment for air pure given any 1 ] in three.

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[Translation done.]